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# Innovation in UK companies. An Evaluation of the Implementation of Best Practice in Front End Innovation Processes and Methodologies

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## ABSTRACT

With the global economy facing its toughest test in over 60 years never has it been so important for companies, large and small, to innovate and grow. Whilst few business leaders would argue with this statement, research has highlighted the difficulty that businesses face in developing commercially successful, innovative products and services. It's well documented that between 80-90% of new product launches fail and whilst 80% of business leaders believe that innovation is important 65% are dissatisfied with their ability to innovate. To understand why successful, innovative products and services appears to be so elusive we conducted original research amongst a sample of UK based companies. The aim of the research was to identify how companies generate potential product ideas and what barriers they face in taking these ideas to the next stage of development. The results showed that whilst small and medium sized companies recognized the importance of innovation they did not have formal processes for generating ideas. In contrast all respondents from large companies reported that their organizations did have formal documented processes for innovation activities. Worryingly, all companies failed to use a sufficiently wide range of research tools to identify customers unmet needs. Another key area of the research was regarding barriers to innovation. Perhaps unsurprisingly, cost was considered to be the greatest barrier. Several of the other top and middle tier barriers to innovation were: lack of communication between departments; senior management; politics; poor decision making processes; and incomplete scientific or technical understanding. These barriers are directly rectifiable by putting specific transparent front end innovation processes in place. Although these problems are likely to differ between different industries the use of some innovation methodologies such as technical forecasting would help in the strategic decision making process. These findings suggest that both SMEs and large companies have gaps in the quality of their innovation systems which present a significant risk that the new products they develop may meet with commercial failure.

## 1. INTRODUCTION

It is widely accepted that innovation is a key factor in economic growth and as a consequence it is a central focus of current government policy [1]. Companies that are successful innovators such as Procter and Gamble, Toyota and Apple have an organizational structure where business functions, processes and culture combine to allow both continuous and transformational innovation to thrive [2]. However, a recent global McKinsey report determined that although 70% of executives said that innovation would be one of the top three drivers of growth in the next few years, they had little confidence in their ability to stimulate innovation with 65% of senior executives stating that they had little confidence in the decisions that they make with regard to innovation [3]. In addition the Thomson Reuters 2011 list of the most innovative global companies has only one UK entrant in the top 100, and the UK does not make the top 10 list of most innovative countries (a list that includes US, Japan, France, Sweden, Germany, Netherlands, South Korea, Switzerland and Liechtenstein) [4].

The new product failure rate has been reported to be as high as 90% [5] and Stevens and Burley have reported, using numerous resources, that for every 3000 new product ideas only one results in commercial success [6]. Furthermore Morris has recently reported that big companies are going out of business faster than before [7]. To highlight this Morris reports that if current trends hold only one-

quarter of today's S&P 500 companies will be part of the top 500 list by 2020. Morris emphasizes that to survive all organizations must develop a comprehensive innovation framework.

The last 20 years has seen a considerable emphasis within the academic and practitioner communities on how best to create and manage innovation and to understand why the development of successful, innovative products and services appears to be so elusive. In a recent Booz and Company's survey of the 1000 global companies that spend most on research and development they identified that although there are three distinct top level innovation strategies that companies adopt, in reality successful companies do some common things well [8]. A more detailed appraisal of the Booz report highlighted that the common practices shared amongst best performing companies included critical innovation capabilities such as insightfulness into customers' needs, an understanding of the relevance of emerging technologies and an ability to work closely with users during concept development. Many of the critical innovation activities identified in the study relate to activities at the front end of innovation and are often referred to as pre-development activities or front end activities. Indeed the front end of the innovation process is perhaps the single most important aspect of innovation and there is evidence to suggest that the single greatest difference between winners and losers is the quality of the pre-development activities or front end activities [9]. Front end of innovation activities are how companies generate new product, service or process ideas and how they select those with the most commercial promise. This stage of the innovation process is often called 'fuzzy' front end [10], a term that reflects the lack of clarification and information that often exists before innovation projects become formally recognized. The importance of the front end of innovation cannot be underestimated as making the wrong decision and progression of the wrong project can lead to commercial failure. In addition to the immediate cost and resources involved, the organization might lose ground on competitors, suffer a loss of reputation and in some circumstances might result in the company going out of business.

It has been known for many years that the use of multiple methods in idea creation is linked to the number of successful products launched [11]. More recently there are many publications that have defined best practice models or flexible frameworks for front end innovation that might be suited for transformational or radical product development [9, 10, 12, 13, 14, 15, 16, 34]. Typical frameworks break the front end innovation process into opportunity identification, identification of customers' needs, idea generation, concept definition and project selection (see figure 1 for a summary). Although some frameworks are more complex or sophisticated than others they all recognize that the decisions made during project initiation are critical and could be the difference between success and failure and company growth or even company survival. Many firms subsequently use a stage gate process to drive, monitor and control new product projects. A typical stage gate system will have a variety of evaluation gates in which senior management can select or kill projects at various stages of product development [17]. The emphasis of this research is the activities companies conduct prior to new product projects entering the conventional stage gate system.

Figure 1 shows some best practice tools that are related to each element and also the subsequent phases of concept definition and enrichment and concept selection. The representation shown in figure 1 does not assume that innovation is linear and accepts that innovation can arise from identifications of a market opportunity, the identification of an unmet customer need or problem, or technical/process/service developments.

To understand why the development of successful, innovative products and services appears to be so elusive we conducted original research amongst a sample of UK based companies. Following a review of the literature it was clear that little research has been performed with regard to how companies, particularly SMEs, generate and select ideas and whether they have formal front end innovation processes. The aim of the research was to identify how companies generate potential product ideas and what barriers they face in taking these ideas to the next stage of development.

## 2. METHODOLOGY

A questionnaire was developed and distributed to a number of small and large companies across a range of industries including medical devices or health related (3 samples), biotechnology (1), food and nutrition (2), animal health (2) and manufacturing (1). Different industries were included as it was considered important to attempt to generate a broad snapshot that might be relevant to workers in numerous fields. A small to medium sized enterprise (SME) was defined according to European Union (EU) law as a company with less than 250 employees.

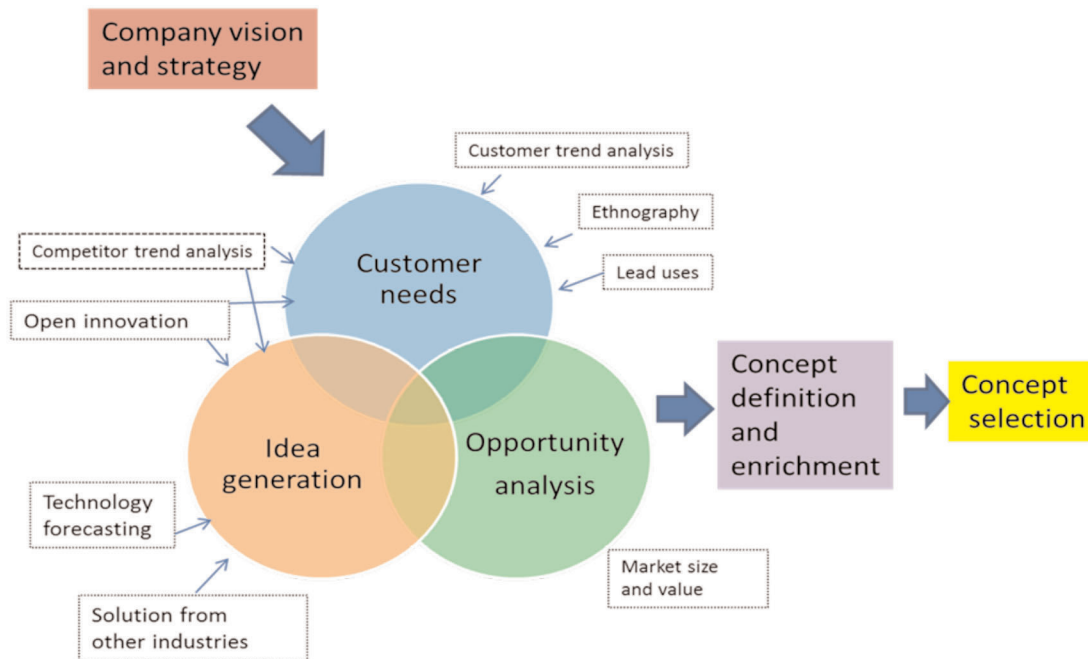


Figure 1. A Basic Summary of the Need to Equate Ideas, with customer need and an Attractive Opportunity (in Monetary Terms).

Individuals, at management level, were identified and using a web based information gathering system respondents were asked a defined set of questions. Each respondent was asked about the type and size of the company and whether innovations were incremental or radical, and the importance of innovation to their organizations future.

The questionnaire was designed to identify the respondents opinion with regard to the ability of their organization to innovate compared to competitors and their organizations innovation processes and systems. Likewise the respondents were asked whether they felt their organization had formal written innovation processes to identify customers' needs, to capture external ideas or opportunities, generate ideas and other front end related activities (see table 1 & table 2). These questions were designed to address the respondents' perception or belief as to whether their company had formal processes or not. A second series of questions was asked to identify what respondents actually did during innovation projects. For example respondents were asked whether they conducted specific activities or used specific methodologies such as traditional market research, utilized lead users or the others listed in table 1 & 2. The focus of this research was on the tools or methodologies that respondent companies used to identify customer needs (i.e. identify problems) or to generate ideas. Respondents were asked whether they used each technique a) often; b) sometimes; c) rarely; d) never or e) whether they were unfamiliar with the terminology. As the phrases used are standard descriptive terms, often used in the innovation and management literature, unfamiliarity with the phrase was interpreted as evidence that the technique or tool was not used within that respondent's organization. This phase was critical as it identified what respondents organizations do, rather than what they think or say they do. Further details regarding the wording of questions and the techniques assessed is shown in the results section.

Table 1 & 2 provides definitions and a rationale as to why the activity, tool or methodology might be considered important during the front end of innovation.

For questions related to barriers to innovation respondents scored the severity of the barrier on a rating of 1-5, where 1 was considered 'not a barrier' to innovation and 5 a 'severe barrier' to innovation. Scores were added up and the mean provided to determine the severity of the barrier to innovation. Categories were force ranked on the basis of the mean score to identify three tiers of barrier. One aspect of the research was to investigate whether there were any differences in the way in which small and large companies manage innovation. Companies were segmented into whether they were small and medium enterprises (SMEs) or large companies and whether their business unit was a subsidiary of a larger organization.

**Table 1. A Summary of Terms Used to Describe Activities Applicable to the Front End of Innovation: General Aspects of the Innovation Process**

<b>Generic Activities that Might be Conducted During the Early Stage of Innovation</b>	
<b>Activity</b>	<b>Brief Definition and Relevance to Innovation</b>
Identification of ideas	An activity that could include a number of specific techniques such as lead user methodology, technology forecasting, open innovation, brainstorming and solutions from other industries.
Identification of customers' needs	An activity that might utilise a range of techniques including traditional market research, ethnography, lead users and customer trend analysis
Capturing internal ideas or opportunities	A process to capture employee ideas or opportunities. Can be expanded to capture external ideas (in the context of open innovation).
Monitoring idea progression	A tool used by senior management to determine and monitor the progression of a product (from concept through to launch).
Prioritising and selecting the optimal concept	The process of prioritise and selecting concepts based on their ability to meet customers unmet needs
Converting key customer requirements into product design	The process of converting customer needs into product design specifications (e.g. Quality Functional Deployment)

**Table 2. Specific Tools or Methodologies Applicable to the Front End of Innovation and Best Practices Framework for Innovation**

<b>Specific Innovation Tools or Methodologies</b>	
<b>Activity, Tool or Methodology</b>	<b>Brief Definition and Relevance to Innovation</b>
Traditional market research (e.g. questionnaires, interviews, focus groups etc.)	Traditional market research is defined as the use of questionnaires, interviews and focus groups. Traditional market research provides basic information about customers and their requirements. However, it tends to reveal only obvious problems or what customers can articulate. Identification of customer needs by traditional market research alone is likely to push a company towards incremental improvements [17].
Lead users	Lead users are customers who face problems many average customers do not. Their needs significantly anticipate requirements of the broader market. Lead users therefore might make modifications to existing products or design new products. Lead users can thus help identify non-obvious customer problems or alternatively identify potential solutions [19, 20].
Ethnography	Ethnography is the process of identifying customers unmet needs by observation (usually in their own environment). Recent research identified ethnography as the most powerful single approach to identifying customers' non-obvious needs and problems [2, 21].
Customer trend analysis	Customer or market trend analysis is essentially a technique in which historical and current customer behaviour is used to predict future customer behaviour. Understanding market place trends along with clearly understanding customers' needs has been documented as one of the strategies used by Thomas Edison and hence part of the strategy that contributed to his success as an inventor [22].
Open innovation	Open innovation was defined by Henry Chesbrough as "a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology" [23]. It is essentially a realisation that companies might be more innovative if they collaborate or are receptive to ideas from individuals outside their own organisation.
Brainstorming	Brainstorming is a creative thinking and problem solving methodology in which a number of people get together and spontaneously contribute ideas and solutions. There are many brainstorming methodologies [24] and it was not possible within the scope of the research to provide a detailed analysis of the types of methods respondents employed and the question was asked simply to identify whether organisation provide formal time for brainstorming activities.
Technology forecasting	An assessment of technology trends and new technologies might help in the identification of solutions to unmet customer needs or problems. Such techniques predict the direction, character, implications, and impact of technical advances [25].
Solutions from other industries	Formal appraisal of how other industries address analogous problems is a potentially powerful method of general ideas. TRIZ is one systematic means of applying technology trends and solutions from other industries to problem solving [26, 27].

### 3. RESULTS AND DISCUSSION

#### 3.1 The Types of Organization and Innovation Strategy

Nine companies were included in the assessment. For confidentiality reasons these are named A-I, with companies A, B, C, D, G and H being large companies and companies E, F and I small and medium sized enterprises (SMEs). An SME is defined as an organization of <250 employees (see table 3).

Table 3. Summary of Company Size, Respondent Job Title and Type of Innovation Focus. Respondents E, F and I Represented SMEs.

Company Respondent	Position in Company	Number of Employees	Subsidiary of a Larger company	Type of Innovation Focus
A	Project leader	300	yes	Equal
B	Sales manager	3000	yes	Radical
C	Team manager	850	yes	Incremental
D	Innovation Technologist	250	yes	Incremental (but see comment * below)
E	Project manager	100	no	Radical
F	Director	28	no	Incremental
G	R&D Manager	400	yes	Equal
H	Process development manager	3000	no	Equal
I	CEO	5	no	Equal

\*The respondent stated that although he/she often worked on radical projects none were taken forward.

#### Innovation definitions:

***Incremental Innovation*** – Innovations that focus on and offer a marketable improvement of a pre-existing product, process or service to create value for the organization. Typically incremental innovations build on existing knowledge and improve or exploit existing technological trajectories. For example, the addition a new feature to an existing product or service would be considered as an incremental improvement.

***Radical Innovation*** - Typically, radical innovations are those that significantly extend the state of the art and result in breakthrough or major changes of products, services or processes that may lead to obsolescence of existing designs and technologies. Typically they are built on new knowledge and disrupt existing technological trajectories or create new ones. Innovations would be expected to create such a dramatic change in processes, products, or services, leading to unprecedented performance, features or cost.

With regard to the type of innovation two companies focused on radical innovation projects, three companies on incremental type innovations and the respondents from four companies considered that their organization had a mixture of incremental and radical projects. Interestingly one respondent reported that although they were often involved in radical type projects none were taken forward and hence they stipulated the innovation strategy was predominantly incremental.

When asked whether they were satisfied with their organizations ability to innovate compared to their competitors 66.7% of respondents stated that they are satisfied with their organizations ability to innovate compared to competitors but only 33.3% where satisfied with their organizations innovation processes and systems.

#### 3.2 Perceptions Regarding their Organizations' Approach to Innovation

Respondents were asked whether their organization has any formal documented process to identify ideas, identify customer needs, capture ideas or opportunities, monitor idea progression, prioritize and select the optimal concept and convert customer requirements into product design. The results are shown in table 4 and reveal that in general participants from large organizations perceived that their organizations had formalized process for the fore-mentioned front end innovation activities. In contrast none of the SME respondents felt that their organizations had any innovation processes in place. These results clearly show that SMEs do not have formalized processes for optimizing innovation in their organizations, a conclusion that is supported by an evaluation of what their organizations actually do (see section 3.3).



Table 4. Results Detailing Responses to Questions Regarding Whether Their Organization Has Formalized Processes For Various Front End Innovation Related Activities.

Questions: Do you have a formal documented process to:	Organisation								
	A	B	C	D	E	F	G	H	I
					SME	SME			SME
Identify ideas?	yes	yes	yes	no	no	no	yes	yes	no
Identify customers' needs?	don't know	yes	yes	don't know	no	no	yes	yes	no
To capture external ideas or opportunities?	don't know	yes	yes	no	no	no	yes	yes	no
Monitor idea progression?	yes	yes	yes	yes	no	no	yes	yes	no
To prioritise and select the optimal concept?	yes	yes	No	yes	no	no	yes	yes	no
To convert key customer requirements into product design?	yes	don't know	yes	yes	no	no	yes	don't know	yes

Note: The SME Companies (E, F and I) are shown in light grey.

- Respondents from larger companies perceived that their organisations had formal front end innovation processes.
- Respondents from SMEs stated that they 'did not believe' that their organisations had formal front end innovation processes.

### 3.3 An Assessment of the Front End Innovation Related Tools and Methodologies Companies in Use

Companies responding that they do have formal processes does not necessarily mean that they do have formal innovation processes. In addition, even if companies do have some sort of formal innovation system it does not necessarily mean that it is fit for purpose or that the process is adhered too. To identify what practices companies follow, respondents were given examples of specific techniques and asked how frequently they or their organization use them. The results are shown in table 5. Cells colored grey indicate that the company use the techniques at least 'sometimes', whereas the cells that are not highlighted indicate the company 'rarely' or 'never use' the specified tool or technique.

To facilitate gap analysis the results shown in table 5 were amalgamated into those used by SMEs and large companies. The results are shown in figure 2 that summarizes the utilization of each technique and also provides a direct comparison of the uptake of each technique in large companies and SMEs.

Table 5. The Types of Innovation Techniques and Tools Used by the Organizations

Question: How often do you use the following techniques:	Organisation								
	A	B	C	D	E	F	G	H	I
					SME	SME			SME
Brainstorming?	sometimes	often	sometimes	sometimes	rarely	sometimes	sometimes	sometimes	often
Technology forecasting?	rarely	never	rarely	rarely	never	never	sometimes	often	never
Lead users?	sometimes	often	rarely	rarely	rarely	rarely	often	often	often
Traditional market research?	rarely	sometimes	sometimes	sometimes	never	sometimes	often	often	sometimes
Open innovation?	rarely	sometimes	rarely	often	never	never	often	often	rarely
Ethnography?	rarely	never	rarely	never	never	never	never	never	never
Customer trend analysis?	rarely	sometimes	sometimes	often	never	never	sometimes	sometimes	never
Competitive trend analysis?	rarely	sometimes	often	sometimes	never	never	sometimes	sometimes	rarely
Solution from other industries?	sometimes	sometimes	sometimes	sometimes	never	rarely	sometimes	often	never

Blue cells indicate that the company often or sometimes uses the specified technique.

Light orange boxes indicate that the company rarely or never uses that technique.

Gray Column are SME, E,F,& I

Choices were: often; sometimes; rarely; never, don't know

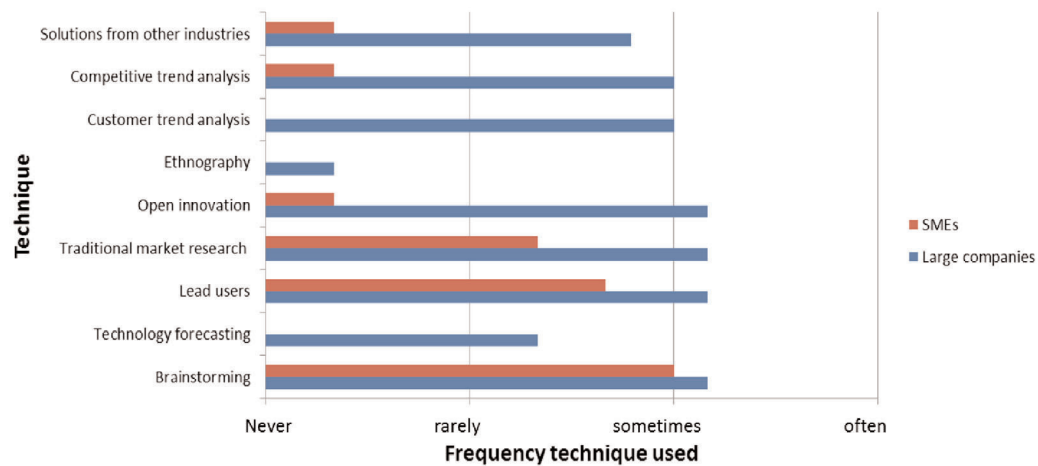


Figure 2. Summary of the Front End Innovation Techniques used in SMEs and Large Companies

### 3.3.1 Techniques used by SMEs

The techniques employed by individual SMEs are shown in table 5 columns E, F and I and summarized in figure 2. The fact that the individual cells in these columns (in table 5) are mainly not highlighted is indicative that front end innovation tools and methodologies are rarely used in SMEs. The results of this phase of the research confirmed the previous observation shown in table 4 and demonstrate that the SMEs evaluated in this study do not have a formal innovation processes.

A deeper evaluation of the techniques used by SMEs show that brainstorming and traditional market research were the tools most frequently employed with only one of the SME companies utilizing lead users (figure 2). It should be noted that the SMEs assessed in this study never or rarely used technology forecasting, open innovation, ethnography, customer trend analysis, competitor trend analysis or solutions from other industries.

- SMEs tended not to use best practice front end innovation techniques thus confirming earlier indications that there are deficiencies in their innovation processes.

### 3.3.2 Techniques Used by Larger Companies

The results shown in table 5 and figure 2 demonstrate that in contrast to SMEs large companies do use a greater range but not all of the innovation techniques. The findings show that activities such as competitor and customer trend analysis (5 out of 6 respondents - 83 %), solutions from other industries (6 out of 6 - 100%) and brain storming (6 out of 6 - 100%) are the most commonly used innovation front end techniques. In addition there is evidence that at least some large companies use lead user methodology (4 out of 6 large companies - 66.6%) and there is evidence that large companies are adopting open innovation philosophies with two thirds of the large companies using open innovation.

However the results showed that there are gaps with some of the most effective and powerful techniques either not used or only used very rarely. For example, ethnography, which is where you actually spend time with customers as they go about their daily activities, was not used at all by 8 (89%) of the organizations included in the study and was used only rarely by the other large company. The finding that neither SMEs or large companies use ethnography was surprising as it indicates that many companies might not be utilizing what is commonly regarded by experts in the innovation field as the single most powerful method of identifying latent or non-obvious customer needs [2,21]. One recent paper that cites a practical example of the power of ethnography was when the technique was used to understand parents and children's needs regarding nappies [28]. The realization that both parents and children prefer to think of nappies as clothing resulted in the introduction of nappies in the form of underpants that children can pull up themselves [28].

A deeper assessment was made of precisely how the companies that were sampled determined customers' needs (sometimes called voice of the customer - VOC). The results show that 7 out of the 9 respondents (77.8%), including 5 of the 6 from large companies, used traditional market research (at



least sometimes) to identify customers' needs. These traditional methods include 1:1 interviews, questionnaires and focus groups. Although traditional methods have some utility their value has been questioned by many experts as they typically result in customers struggling to articulate their needs or simply asking for improvements to existing features. The use of traditional market research has therefore a tendency to lead to incremental improvements or 'me-too' products [18].

Technology forecasting is another best practice technique that was used by only 2 of the 9 (22.2%) organizations assessed. Technology forecasting can take a number of guises but normally relates to the identification of future or emerging technologies that can solve unmet customer needs or problems [25]. In addition a consideration of future technologies can enable a company to assess the impact both on themselves and the competitive environment should that technology be implemented. Such information can not only facilitate the identification of technologies with greatest potential but can also be used by managers, executives and leaders to make critical innovation related decisions based on future scenarios.

A recent meta-analysis conducted by Calantone and colleagues evaluated data from 70 independent samples from 64 studies and concluded that customer orientation, technology turbulence and competitors' orientation all had a positive impact on innovation [29].

Worryingly, all companies failed to use a sufficiently wide range of research tools to identify customers unmet needs, which is where the greatest potential for radically innovative products lies. Although there were only a small number of organizations evaluated in this study it does indicate that there might be a weakness in UK businesses ability to develop world leading products, and might help explain why only one UK company was cited in the top 100 global innovative companies [3].

- Large companies are more likely to have formalized innovation processes.
- However significant gaps exist particular in relation to the tools used to identify customers unmet needs and to generate ideas.

### 3.4 Barriers to Innovation

Another key area of the research was the identification of barriers to innovation. Respondents were asked to score potential barriers to innovation on a rating of 1-5, where 1 was considered 'not a barrier' to innovation and 5 a 'severe barrier' to innovation. The results are summarized in figure 3 and show that there was clearly some degree of differentiation between the barriers receiving the highest scores with those receiving the lowest scores.

To analyze the data further and to allow a means of identifying the most important barriers to innovation, categories were force ranked based on the mean score. The barriers were ranked into three tiers. Firstly, the top tier was defined as those barriers that received a mean score of 3 or higher; the middle tier was those that received a score between 2.5 and 3 and the bottom tier were those barriers

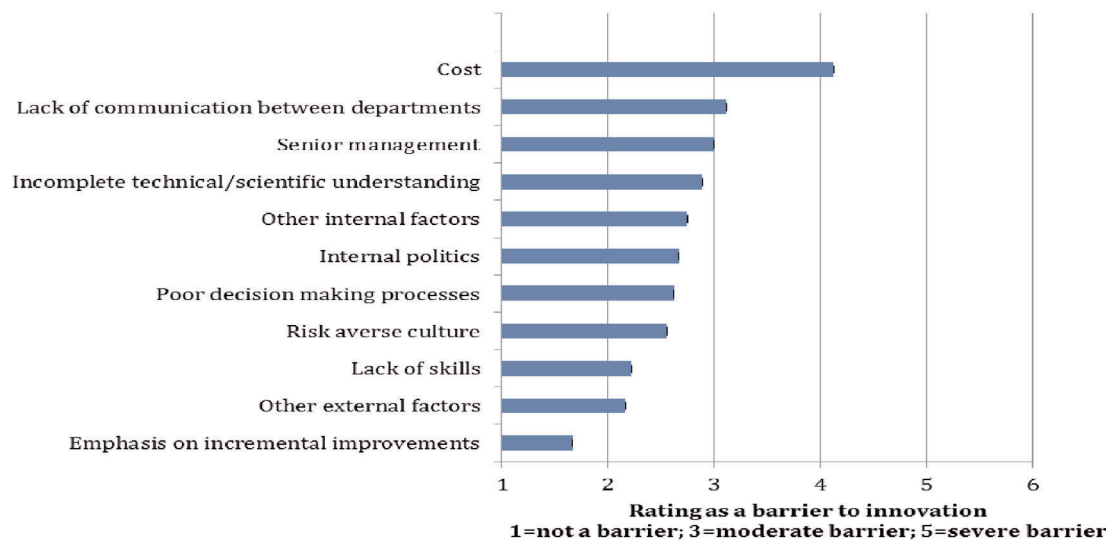


Figure 3. Barriers to Innovation Rated on a Scale of 1-5

receiving a mean score of less than 2.5. Perhaps unsurprisingly cost was considered to be the greatest barrier (see figure 4). Although cost is undoubtedly an issue, the use of formal front end innovation processes could reduce the cost of innovation by identifying high value opportunities, killing projects that are likely to end in failure quickly and only selecting optimal concepts that have a high probability of success (see figure 5 for a summary). In this way the cost, amount of resources and time spent on inappropriate projects can be reduced thereby eliminating waste and potentially freeing up more resource for the high value projects that offer the greatest potential rates of return.

Several of the other top and middle tier barriers to innovation reflected lack of communication between departments, senior management, politics and poor decision making processes. Such areas are generally considered as cultural or non-process areas and there is a significant amount of literature discussing the relationship of innovation and culture and that non-process elements such as skills, leadership (including innovation champions) and attitude to risk are important [16, 30, 31, 32]. It is important however to point out that there is a link between process and culture [30], and it is logical to predict that these cultural and communication related barriers are directly rectifiable by putting specific transparent front end innovation processes in place (see figure 5). The other main barrier to innovation is incomplete scientific or technical understanding. Although these problems are likely to differ between different industries the use of some innovation methodologies such as technical forecasting could help in the strategic decision making process.

A summary of the barriers to innovation and how front end innovation processes might diminish barriers to innovation is shown in figure 5. In practical terms the implementation of such processes might reduce costs, reduce ambiguity, mitigate commercial and technical risk and help ensure that the optimal concept is moved forward to development and commercialization.

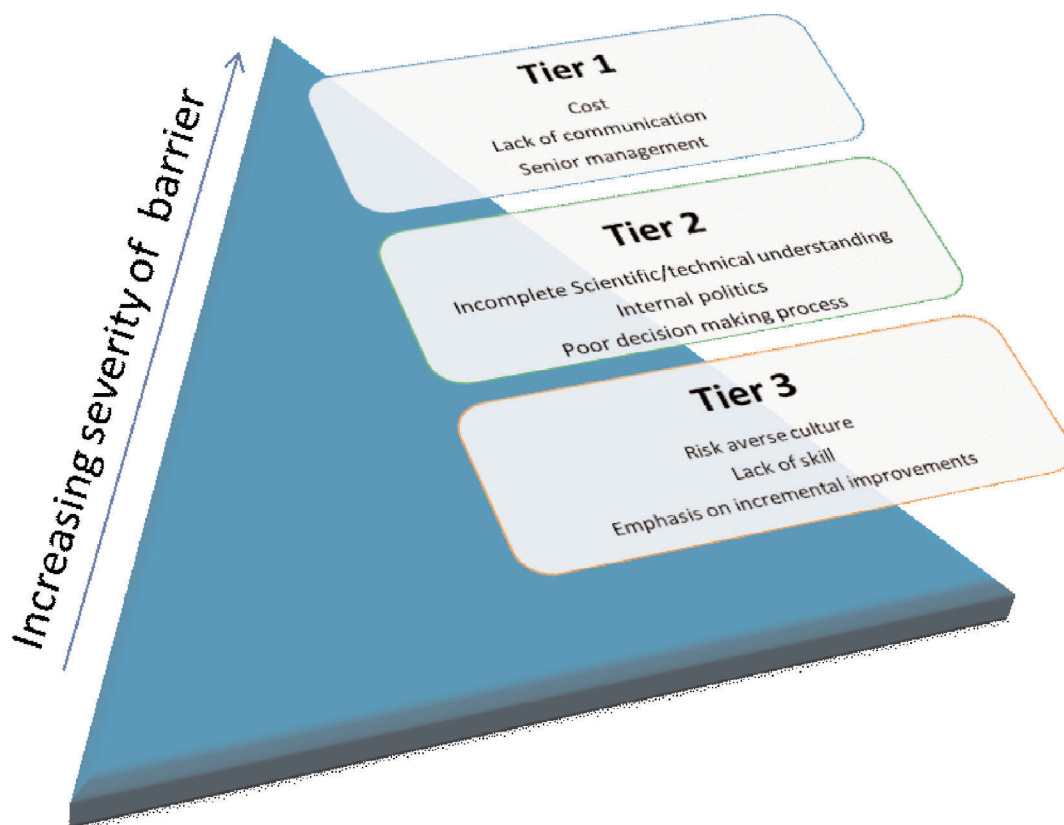


Figure 4. Summary of the Barriers to Innovation

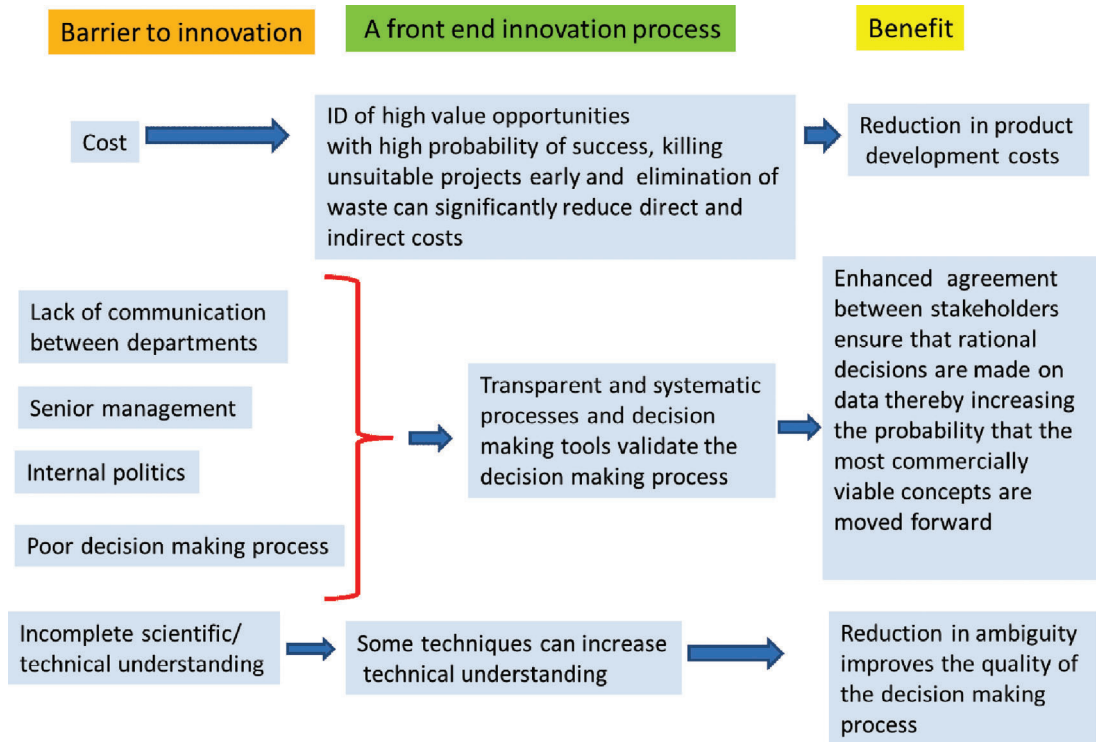


Figure 5. Summary of How a Front End Process can Attenuate some of the Barriers to Innovation

- Although there are numerous barriers to innovation the inclusion of front end innovation process could help to remove or at least reduce the impact of these by reducing cost and ensuring that clear decision making processes occur based on rational customer need and business requirement input.

#### 4. GENERAL DISCUSSION AND IMPLICATIONS

This is the first study, to the authors' knowledge, that has specifically looked at UK companies and attempted to assess the quality of their front end innovation systems. Although the study was small and focused primarily on the ways ideas are generated and customer needs are assessed, and not the critical phase of project selection, the work represents a snap shot of what companies do and highlights that there are critical gaps. If companies are to reach their potential they need to review, and improve their innovations processes.

The work presents evidence that there are gaps in the way both SMEs and large companies innovate. SMEs are more likely than large companies to have no formal innovation system at all. Despite the fact that large companies are more likely to have formal innovation processes, the evidence presented suggests that many companies are not using a sufficiently wide range of research tools to identify and select appropriate opportunities. The two innovation methodologies that were least utilized by the companies in this study were ethnography and technology forecasting. The recent study of Jaruzelski and Dehoff concluded that the most successful global companies that spend most on R&D are differentiated with regard to their insightfulness into customers' needs and understanding of the relevance of emerging technologies [7]. Clearly the routine adoption of the use of ethnography and technology forecasting would enhance a company's awareness and knowledge of these critical enablers of innovation.

At the beginning of this article we referred to the use of the term 'fuzzy front end'. However the front end does not need to be fuzzy and the use of simple, yet powerful, methodologies and processes would help companies gain competitive advantage by facilitating ways to identify opportunities and selecting those most likely to gain commercial success. In addition the use of such processes might reduce the barriers to innovation and therefore unlock the innovation potential of an organization.

The results are of high importance in that they highlight that companies are failing to adhere to best practice and that this has a major impact on their competitiveness. A review of the literature did not identify any evidence of any researchers having conducted UK focused study of front-end of innovation practices. The fact that no other contemporary research has explored in detail the utilization of front end innovation processes combined with the importance and implications of such research at both the company and broader economic level means that it is immensely important that future further studies are conducted to fully understand the adoption rates of best practice processes in both small and large companies. Our future research will include a larger survey targeting hundreds of companies across industrial sectors. It is anticipated that this research will also investigate in more detail whether companies are using appropriate processes to prioritize and select optimal concepts for entrance into formal new product development funnels or stage gate systems.

Based on the output of the research reported in this paper companies should review their innovation systems and if necessary provide training or education to ensure that their employees have the knowledge to ensure that their systems maximize the potential of their organization.

## 5. SUMMARY

This research has revealed a significant weakness in the innovation process which UK companies use to generate potential new product and service ideas. Our key findings can be summarized very simply: companies are generally not using a wide enough range of tools to capture insights from the markets they serve (or would like to serve) and most are relying upon traditional research techniques which tend to lead to minor improvements to existing products. Henry Ford recognized the problem of asking customers what they want nearly one hundred years ago when he said 'If I had asked people what they wanted, they would have said faster horses'. Highly innovative companies go beyond the obvious incremental improvements to create ground breaking products like the Dyson bag-less vacuum cleaner or the Apple iPad. The second major finding was that innovation is being stymied by an organizational culture burdened with interdepartmental in-fighting and poor leadership. Leaders place innovation high on their priority list but are failing to align the organization with this aim and are thus hampering their own chance of success.

From a wider perspective the impact of innovation on the economy also needs to be brought to wider attention. In a recent interview Professor Prahalad, one of the world's leading innovation strategists, highlighted that during debates about how to get out of the recession there is currently very little discussion about innovation at the political level and even amongst prominent business periodicals such as Businessweek or the Wall Street Journal [33]. Professor Prahalad describes this as the 'singular missing point' and although outside the remit of this article there is clearly a challenge to elevate innovation up the political and economic agenda.

Modern global economies need more innovative companies to create wealth and jobs. Companies therefore need to create innovative products and services in order to prosper. In addition individuals want to work for organizations that are successful and forward thinking. Our research provides a snapshot of how companies generate new ideas and clearly highlights that there are gaps and that companies, which are hoping to become more innovative, need to improve their front end innovation processes.

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